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10/649,387	08/27/2003	Yuuta Nakaya	FUJX 20.578	6055

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KATTEN MUCHIN ROSENMAN LLP
575 MADISON AVENUE
NEW YORK, NY 10022-2585

EXAMINER	
FOX, BRYAN J	
ART UNIT	PAPER NUMBER
2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/649,387	NAKAYA ET AL.
	Examiner	Art Unit
	Bryan J. Fox	2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/26/06*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2617.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-6, 15-20 and 29-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kezys in view of Yoshida (US 20020190901A1).

Regarding **claim 1**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of array antennas." The output of the optimization computation is directed to control the

weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating a set of weights for elements of each of the plurality of array antennas, the set of weights being such values as to allow each of the array antennas to function as an adaptive beam forming array antenna; a weights setting section for selecting, from the calculated set of weights, a particular set of weights from the calculated sets of weights, and for applying the particular set of weights for an array antenna that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section." Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received at the plurality of array antennas by use of the particular set of weights." Kezys fails to expressly disclose setting the particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 2**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of array antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "weigh setting section for selecting, from the calculated set of weights, a particular set of weights for an array antenna that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section." Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received at the plurality of array antennas by use of the particular set of weights." Kezys fails to expressly disclose setting the particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna

reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 3**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of array antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating arrival angles of a desired wave and of a disturbing wave as the arriving waves for each of the plurality of array antennas; a weight setting section for selecting, from the calculated arrival angles, an arrival angle of a desired wave as an arriving wave with good channel quality as monitored by the channel quality monitoring section and an arrival angle of a disturbing wave, and for setting a particular set of weights...with values to allow each of the array antennas to have a main lobe in a direction of the arrival angle of the desired wave and have a null point in a direction of the arrival angle of the disturbing wave," wherein changing the weights on the antenna array corresponds to changing the direction of the antenna array. Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of array antennas to which the particular set of weights are applied."

Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 4**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of array antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating arrival angles of a desired wave and of a disturbing wave as the arriving waves and a set of weights, the set of weights being such values as to allow each of the array antennas to function as an adaptive null-forming array antenna; a

weight setting section for selecting, from the calculated arrival angles, an arrival angle of a desired wave as an arriving wave with good channel quality as monitored by the channel quality monitoring section and an arrival angle of a disturbing wave, for correcting one of the calculated sets of weights to such values as to allow an array antenna, that received an arriving wave with maximum channel quality as monitored the channel quality monitoring section, to have a main lobe in a direction of the arrival angle of the desired wave and have a null point in a direction of the arrival angle of the disturbing wave and for setting the corrected set of weights," wherein changing the weights on the antenna array corresponds to changing the direction of the antenna array. Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of array antennas to which the particular set of weights are applied." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna

reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 5**, the combination of Kezys and Yoshida discloses that preferably, all of the antenna elements are mounted on a single structure, such as a planar square or disk (see Kezys column 9, lines 21-38), which reads on the claimed, "each of the plurality of array antennas is composed of elements; and the elements of each of the array antennas are arranged on a same virtual line or plane parallel to each position of the plurality of array antennas."

Regarding **claim 6**, the combination of Kezys and Yoshida discloses that preferably, all of the antenna elements are mounted on a single structure, such as a planar square or disk (see Kezys column 9, lines 21-38), which reads on the claimed, "each of the plurality of array antennas is composed of elements; and the elements of each of the array antennas are arranged on a same virtual line or plane parallel to each position of the plurality of array antennas."

Regarding **claim 15**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of aerial beam forming antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed,

"computing section for calculating a set of reactances for elements of each of the plurality of aerial beam forming antennas, the set of reactances being loaded on each of the elements of the aerial beam forming antennas; a reactance setting section for selecting, from the calculated sets of reactances, a particular set of reactances for an aerial beam forming antenna that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section." Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of array antennas to which the particular set of reactances are loaded." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 16**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as

a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of aerial beam forming antennas." The output of the optimization computation is directed to control the reactances on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating a set of reactances for elements of each of the plurality of aerial beam forming antennas, the set of reactances being loaded on each element of the aerial beam forming antennas and being such values as to allow each of the aerial beam forming antennas to function as an adaptive null-forming array antenna; a reactance setting section for selecting, from the calculated sets of reactances, a particular set of reactances for an aerial beam forming antenna that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section." Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of array antennas to which the particular set of reactances are loaded." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 17**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of aerial beam forming antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating arrival angles of a desired wave and of a disturbing wave as the arriving waves for each of the plurality of aerial beam forming antennas; a reactance setting section for selecting, from the calculated arrival angles, an arrival angle of a desired wave as an arriving wave with good channel quality as monitored by the channel quality monitoring section and an arrival angle of a disturbing wave,and for setting a particular set of reactances with values to allow each of the aerial beam forming antennas to have a main lobe in a direction of the arrival angle of the desired wave, and have a null point in a direction of the arrival angle of the disturbing wave," wherein changing the weights on the antenna array corresponds to changing the

direction of the antenna array. Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received at the plurality of aerial beam forming antennas by use of the particular set of reactances." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 18**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of aerial beam forming antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed,

"computing section for calculating, for each of the plurality of beam forming antennas, arrival angles of a desired wave and of a disturbing wave and a set of reactances, the set of reactances being such values as to allow each of the aerial beam forming antennas to function as an adaptive null-forming array antenna; a reactance setting section for selecting, from the calculated arrival angles, an arrival angle of a desired wave as an arriving wave with good channel quality as monitored by the channel quality monitoring section and an arrival angle of a disturbing wave, and for correcting one of the calculated sets of reactances to such values as to allow an aerial beam forming antenna, that received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section, to have a main lobe in a direction of the arrival angle of the desired wave and have a null point in a direction of the arrival angle of the disturbing wave and for setting the corrected set of reactances," wherein changing the weights on the antenna array corresponds to changing the direction of the antenna array. Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of array antennas to which the particular set of reactances are loaded." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 19**, the combination of Kezys and Yoshida discloses that preferably, all of the antenna elements are mounted on a single structure, such as a planar square or disk (see Kezys column 9, lines 21-38), which reads on the claimed, "each of the plurality of aerial beam forming antennas is composed of elements; and the elements of each of the aerial beam forming antennas are arranged on a same virtual line or plane parallel to each position of the plurality of array antennas."

Regarding **claim 20**, the combination of Kezys and Yoshida discloses that preferably, all of the antenna elements are mounted on a single structure, such as a planar square or disk (see Kezys column 9, lines 21-38), which reads on the claimed, "each of the plurality of aerial beam forming antennas is composed of elements; and the elements of each of the array antennas are arranged on a same virtual line or plane parallel to each position of the plurality of aerial beam forming antennas."

Regarding **claim 29**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality

of adaptive beam forming antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "weight setting section for selecting from sets of weights used for the plurality of adaptive beam forming array antennas, a particular set of weights for an adaptive beam forming array antenna that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section and for setting the particular set of weights as corrected values." Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of adaptive beam forming array antennas." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 30**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of adaptive null-forming array antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "weight setting section for selecting from sets of weights used for the plurality of adaptive null-forming array antennas, a particular set of weights for an adaptive null-forming array antenna that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section and for setting the particular set of weights as corrected values." Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of adaptive null-forming array antennas." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 31**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality of adaptive null-forming array antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating arrival angles of a desired wave and of a disturbing wave as the arriving waves for each of the plurality of adaptive null-forming array antennas; a weight setting section for selecting, from the calculated arrival angles, an arrival angle of a desired wave as an arriving wave with good channel quality as monitored by the channel quality monitoring section and an arrival angle of a disturbing wave, for correcting a set of weights to be applied to an adaptive null-forming antenna to such values as to allow the adaptive null-forming array antenna, that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section, to have a main lobe in a direction of the arrival angle of the desired

wave and have a null point in a direction of the arrival angle of the disturbing wave, and for setting the corrected set of weights," wherein changing the weights on the antenna array corresponds to changing the direction of the antenna array. Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of adaptive null-forming array antennas." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 32**, Kezys discloses an array antenna system where an optimization criterion is computed based upon the content of a received signal, such as a signal to noise ration (see column 5, line 40 – column 6, lines 8), which reads on the claimed, "radio communication apparatus comprising: a channel quality monitoring section for monitoring channel quality of each of arriving waves that arrive at a plurality

of adaptive null-forming array antennas." The output of the optimization computation is directed to control the weights on the antenna so that the antenna is able to operate in high interference environments (see column 6, lines 9-25), which reads on the claimed, "computing section for calculating arrival angles of a desired wave and of a disturbing wave as the arriving waves for each of the plurality of adaptive null-forming array antennas; a weight setting section for selecting, from the calculated arrival angles, an arrival angle of a desired wave as an arriving wave with good channel quality as monitored by the channel quality monitoring section and an arrival angle of a disturbing wave, for correcting a set of weights to be applied to an adaptive null-forming antenna to such values as to allow the adaptive null-forming array antenna, that has received an arriving wave with maximum channel quality as monitored by the channel quality monitoring section, to have a main lobe in a direction of the arrival angle of the desired wave and have a null point in a direction of the arrival angle of the disturbing wave, and for setting the corrected set of weights," wherein changing the weights on the antenna array corresponds to changing the direction of the antenna array. Because the antennas are part of an array (see column 5, lines 32-57), their outputs are combined, which reads on the claimed, "combining section for combining arriving waves received with the plurality of adaptive null-forming array antennas." Kezys fails to expressly disclose setting a particular set of weights in common to all of the plurality of array antennas.

In a similar field of endeavor, Yoshida discloses the antenna weights w(l,n) may be common to the respective arrays 31-1 and 31-2. (see paragraph 67 and 74), which

reads on the claimed, "setting the particular set of weights in common to all of the plurality of array antennas."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kezys with Yoshida to include the above applying antenna weights in common to all the antenna arrays in order to provide an adaptive antenna reception apparatus which can realize an excellent adaptive control characteristic as suggested by Yoshida (see paragraph 28).

Regarding **claim 33**, the combination of Kezys and Yoshida discloses that preferably, all of the antenna elements are mounted on a single structure, such as a planar square or disk (see Kezys column 9, lines 21-38), which reads on the claimed, "each of the plurality of adaptive null-forming array antennas is composed of elements; and the elements of each of the adaptive null-forming array antennas are arranged on a same virtual line or plane parallel to each position of the plurality of adaptive null-forming array antennas."

Regarding **claim 34**, the combination of Kezys and Yoshida discloses that preferably, all of the antenna elements are mounted on a single structure, such as a planar square or disk (see Kezys column 9, lines 21-38), which reads on the claimed, "each of the plurality of adaptive null-forming array antennas is composed of elements; and the elements of each of the adaptive null-forming array antennas are arranged on a same virtual line or plane parallel to each position of the plurality of adaptive null-forming array antennas."

Claims 7-14, 21-28 and 35-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kezys in view of Yoshida as applied to claims 1-4, 15-18 and 29-32, and further in view of Lindskog et al (US006738020B1).

Regarding **claims 7-10**, the combination of Kezys and Yoshida fails to expressly disclose feeding sections provided on feed lines of all or part of the plurality of array antennas, for employing a set of weights for transmitting a transmission wave via the feed line(s), the set of weights being obtained by correcting the particular set of weights in accordance with frequency differences between the transmission wave and the arriving waves.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections provided on feed lines of all or part of the plurality of array antennas, for employing a set of weights for transmitting a transmission wave via the feed line(s), the set of weights being obtained by correcting the particular set of weights in accordance with frequency differences between the transmission wave and the arriving waves."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Regarding **claims 11-14**, the combination of Kezys and Yoshida fails to expressly disclose feeding sections for applying the particular set of weights to feeding line(s) of transmission array antennas which is/are used for transmission of a transmission wave having a different frequency from frequencies of the arriving waves, wherein all or part of the plurality of array antennas is/are paired with the transmission array antennas.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections for applying the particular set of weights to feeding line(s) of transmission array antennas which is/are used for transmission of a transmission wave having a different frequency from frequencies of the arriving waves, wherein all or part of the plurality of array antennas is/are paired with the transmission array antennas," wherein using the same values adjusted for frequency differences reads on the pairing.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Regarding **claims 21-24,** the combination of Kezys and Yoshida fails to expressly disclose feeding sections provided on feed lines of all or part of the plurality of aerial beam forming antennas, for employing a set of reactances for transmitting a

transmission wave via the feed line(s), the set of reactances being obtained by correcting the particular set of reactances in accordance with frequency differences between the transmission wave and the arriving waves.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections provided on feed lines of all or part of the plurality of aerial beam forming antennas, for employing a set of reactances for transmitting a transmission wave via the feed line(s), the set of reactances being obtained by correcting the particular set of reactances in accordance with frequency differences between the transmission wave and the arriving waves."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Regarding **claims 25-28**, the combination of Kezys and Yoshida fails to expressly disclose feeding sections for applying the particular set of reactances to feeding line(s) of transmission aerial bema forming antennas which is/are used for transmission of a transmission wave having a different frequency from frequencies of the arriving waves, wherein all or part of the plurality of aerial beam forming antennas is/are paired with the transmission aerial beam forming antennas.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections for applying the particular set of reactances to feeding line(s) of transmission aerial bema forming antennas which is/are used for transmission of a transmission wave having a different frequency from frequencies of the arriving waves, wherein all or part of the plurality of aerial beam forming antennas is/are paired with the transmission aerial beam forming antennas," wherein using the same values adjusted for frequency differences reads on the pairing.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Regarding **claim 35**, the combination of Kezys and Yoshida fails to expressly disclose feeding sections provided on feed lines of all or part of the plurality of adaptive beam forming array antennas, for employing a set of weights for transmitting a transmission wave via the feed line(s), the set of weights being obtained by correcting the particular set of weights in accordance with frequency differences between the transmission wave and the arriving waves.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and

to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections provided on feed lines of all or part of the plurality of adaptive beam forming array antennas, for employing a set of weights for transmitting a transmission wave via the feed line(s), the set of weights being obtained by correcting the particular set of weights in accordance with frequency differences between the transmission wave and the arriving waves."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Regarding **claims 36-38**, the combination of Kezys and Yoshida fails to expressly disclose feeding sections provided on feed lines of all or part of the plurality of adaptive null-forming array antennas, for employing a set of weights for transmitting a transmission wave via the feed line(s), the set of weights being obtained by correcting the particular set of weights in accordance with frequency differences between the transmission wave and the arriving waves.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections provided on feed lines of all or part of the plurality of adaptive null-forming

array antennas, for employing a set of weights for transmitting a transmission wave via the feed line(s), the set of weights being obtained by correcting the particular set of weights in accordance with frequency differences between the transmission wave and the arriving waves."

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Regarding **claims 39-42**, the combination of Kezys and Yoshida fails to expressly disclose feeding sections for applying the particular set of weights to feeding line(s) of transmission array antennas which is/are used for transmission of a transmission wave having a different frequency from frequencies of the arriving waves, wherein all or part of the plurality of adaptive null-forming array antennas is/are paired with the transmission array antennas.

In a similar field of endeavor, Lindskog et al disclose a system with a transformation function that can correct for coupling between the antenna elements and to compensate for any differences in carrier frequency between received signals and transmitted signals (see column 8, lines 61-67), which reads on the claimed, "feeding sections for applying the particular set of weights to feeding line(s) of transmission array antennas which is/are used for transmission of a transmission wave having a different frequency from frequencies of the arriving waves, wherein all or part of the plurality of

array antennas is/are paired with the transmission array antennas," wherein using the same values adjusted for frequency differences reads on the pairing.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kezys and Yoshida with Lindskog et al to include the above correction for transmit versus receive frequencies in order to use the optimal weightings in a frequency division duplex system.

Response to Arguments

Applicant's arguments with respect to claims 1-42 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan J. Fox whose telephone number is (571) 272-7908. The examiner can normally be reached on Monday through Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on (571) 272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Bryan Fox
July 10, 2006

JOSEPH FEILD
SUPERVISORY PATENT EXAMINER